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To: DWR CWP Comments <cwpcom@water.ca.gov>;

re: CA Water Plan Update 2018/9

It is with displeasure & dismay that I reply to you on the shortcomings of the plan.

I. Water Quantity

California invests in conversion practices unawares. Our engineering from agriculture to fire-ifhgting converts recharge into drainage, infiltration into runoff, and there is no quantifiable measure of this conversion in the past 150 years.

Fire regimes: Bandier National Park (New Mexico) and Los Alamos (CA) completed a software program to quantify wet soil and dry saols after a fire, and generally the science leans toward high-severity mega-fires as the cause of drier post-fire soils. Mild-to-moderate fires leave the soils wetter. CA has changed fire regimes in the wild, from a natural fires regime to a mega-fire regimes. This calculates to an infiltration loss and loss of recharge. Likewise, high-severity mega-fires can burn off the the absorbent layers of duff and litter to leave a water-repelling plate, like rammed earth, only sealed with waxes from the burnt vegetative materials. I expected the Water Pan to try to compute the extent of this loss of recharge.

Levies: Levies were narrowly built to channelize flood flows. In doing so (to protect infrastructure) floodplain infiltration and recharge decreased. The Water Plan makes no attempt to compute this loss.

farms & ranches: Two uncalculated issues here. One, plows, tillage and off-road vehicles form plow pans that prevent infiltration and recharge. Some lands have natural pans, but natural or not, the solution has been tiling to facilitate runoff. 80% of Iowa's cropland is tiled, accordng one footnote in the Leopold Center for Sustainable Agriculture newsletter from Iowa State. Europe invested in the design of ag equipment that produced less plow-pan formation, like the "spader." In net effect, plow pans and tiling have increased drainage at the expense of groundwater recharge, and the water plan makes not attempt to calculate the amount of the loss.

Roads: Roads are artificial watercourses that drain rather than recharge. UCCE tells us this - roads aree "artificial streams." UCCE recomends rural roads and forest roads be out-sloped or crowned so that rain washes into infiltration zones and not into ditches, storm sewers and culverts which channelize the flows oceanward.

Gutters: Houses are built to channelize rainfall and send it ultimately oceanward, depriving the land of recharge function. Gutters also colect leaves before and during a fire. Recent science by USFS Jack Cohen and NFPA demonstrate that houses do not burn because of flame contact but burn because of ember showers that ignite gutter leaves. Paradise didn't have to happen.

Forests: CalFire is the state's big joke: Roads and skid trails are soil dams, interfering with the natural flow of water in the soil and consequent recharge. No calculation is made of this recharge loss. We over-stock forests, crowding them with trees, upsetting the natural fire regimes and creating mega-fires of great ferocity of destruction to the soils - soils are trees in entropy. If we burn soil with high-intensity fire, we lose strains of mycorrhizae that make trees grow, we lose burrowed mice who re-emerge after a fire to poop the mycorrhizal spores. We lose the seedbanks of herbs and grass that protect the soil from harsh and heavy rains. Not all fires are the same, and the wrong fire regime can escalate the loss of recharge water and acerbate a drought. None of this management shortfall has been calculated in terms of water loss.

Bare soil: It used to be that CalFire urged homeowners to kill their grasses with herbicides when the CA Water Plan recmended leaving 4-inches to boost water infiltration and intake by the soil. PG&E after fires came in and did understory removal. Removing understory vegetation from an ecosystem is like removing one wheel from a car to prevent speeding. It works, kinda! Farmers and ranchers are using cover crops on tilled fields which aids infiltration. Deep ripping aids percolation. Ultimately, infiltration and percolation mean more groundwater. Water is the forest's most important product; yet, foresters manage forests for timber. Because exterior timber makes structures vulnerable, the timber lobby shoved the state fire marshall's office under CalFire (CDF) whose mission is timber markets. Clean water is in part a economic "free good," like air, meaning that we don't pay its worth and value. Lumber, by contrast, is an economic good and therefore, forest management prioritizes lumber over water conservation. Forest production of clean water must have waned in 150 years, and yet no forestry-researcher calculates the loss.

My contention is that these factors should be calculated to enable CA to prioritize its funding to projects, in order to get the biggest bang for the uck and the greatest leap forward. It's also necessary to identify BMPs that recharge groundwater.

II Water quality

We have 60 superfund sites across the nation where training (only training at airports) caused groundwater contamination with previously unregulated chemicals - namely the aqueous film-forming foam used to suppress grease and jet fuel fires. Many pesticides contribute to autism and intersex variation in humans (See Huk-Hee Lee in Endocrinol. Metab on line for meta-analysis) which the peer-reviewed journal NATURE-Neurology has called "the silent pandemic of neurodevelopmental toxicity."

I think the CA Water Plan should mention "nonmonotonic" toxicity. For years medicine believed in thresholds - levels below which a substance was safe and above which it was poisonous. Ruckelshaus, head of the EPA under Reagan, adopted "dose-response" paradigms: the higher the dose, the greater the effect. Even then, the journal Health Physics postulated a "multistage model" of carcinogenesis. In 1992 the National Science Foundation warned that the US did not screen new industrial chemicals and pesticides for their impacts on the endocrine system, the nervous system & brain, and the reproductive system. The state of nation's science lends absolute credence to the notion that we are changing the human epigenome by fetal exposures that result in adult diseases - obesity, autism and diabetes being three of them. This has to do with water, food & contamination, and the water plan update ought to lay out the risks to future generations if the plan is to clalitself sustainable. CA doesn't even track or regulate endocrine disruptors, more harmful as mixtures than as individual chemical exposures. Europe is doing it, why can't CA? Why isn't it in the water plan? Sustainability is aout protecting future generations, and it has three components: economy, ecology, equity (community) dubbed "people, profits, planet." The water plan is sustainable in regard to water quantity, but not sustainable in regard to water quality. herefore, I think false word "sustainable" should be dropped, or the plan should note that only water quantity issues measure up to sustainability.

Included in water quality outlooks is the issue of food - what we consume as food determines our health, and how we grow it determines the environmental fate of planet earth. Water is used for irrigation; its contaminants wind up in food. For example, the toxic metal cadmium acts as a hormone disruptor to cause breast cancer, and a European study sought to identify the source of exposure to cadmium - fertilizers as the tainted source - "Food ... is the only major route of exposure to cadmium in the nonsmoking poplation." There has got to be water contamination of surface and groundwater from cadmium (from fertilizers) but nobdy tests for it in water - no coalition of farmers to meet WDRs, no water company reports on it. Every living soil in the U.S. has detectable PFAs in their blood from exposure to food and water, but CA doesn't screen for it.

I think the Water Plan does a disservice to CA's people by pushing misconceptions about the state's water quality. When 80% of fish in a segment of river are intersex, it's no longer a river, it's a sewer. The water plan does not even set such standards which have been set by legislation in 1968, and incorporated into the Clean Water Act of 1972, and in California Water Code, including in the Porter-Collogne Act, which doesn't seem to shape the current Water Plan Update.

I am displeased and dismayed by the colossal gap between the Water Plan Update and the current status of water/watershed science. For example, Organic farming and/or Regeneratice Farming is likely to imprrove water quantity and quality, and perhaps promoting these agrcultural practices would deserve mention in the UPDATE. I see no mention.

RSVP that you received and read these reiterated comments,

Bud Hoekstra